REMARKS

Favorable reconsideration of this application, as presently amended and in light of the following discussion, is respectfully requested.

Claims 1-27 are currently pending, with Claims 10-19 being withdrawn as directed to non-elected inventions. Claims 1, 10, 14, 17, 21, and 27 have been amended by the present amendment. The changes to the claims are supported by the originally filed specification and do not add new matter.

In the outstanding Office Action, Claims 1-3 and 20-27 were rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,566,787 to Tsukahara et al. (hereinafter "the '787 patent") in view of Japanese Patent Application JP 2002-026688 to Nakaso (hereinafter "the '688 patent"); Claims 4-7 were rejected under 35 U.S.C. § 103(a) as being unpatentable over the '787 and '688 patents in view of U.S. Patent No. 6,029,500 to Tom (hereinafter "the '500 patent"); and Claims 8 and 9 were rejected under 35 U.S.C. § 103(a) as being unpatentable over the '787 and '688 patents in view of U.S. Patent No. 6,060,692 to Bartley et al. (hereinafter "the '692 patent").

Amended Claim 1 is directed to a sensor head, comprising: (1) a three-dimensional base body having a curved surface allowing definition of a circular orbital band; (2) an interdigital electroacoustic transducer being connected to a timing-controlled switching unit disposed outside of the sensor head, and arranged on the orbital band of the three-dimensional base body, and configured to excite a surface acoustic wave to perform multiple roundtrips along the orbital band; and (3) a gas-sensitive film at least a part of which is formed on at least a part of the orbital band of the three-dimensional base body, and configured to react with a specific gas molecule so as to develop a change in a propagation characteristic of the surface acoustic wave, wherein the timing-controlled switching unit is configured to switch between an external high frequency generator and an external

detection/output unit so that the timing-controlled switching unit is configured to transfer a high frequency electric signal from the external high frequency generator to the interdigital transducer, and then the timing-controlled switching unit is configured to switch a signal path from the interdigital transducer to the external detection/output unit, after the interdigital transducer has transmitted the surface acoustic wave, but just before the surface acoustic wave returns from a predetermined number of a plurality of roundtrips, and the interdigital transducer is configured to convert the surface acoustic wave orbiting along the orbital band into a high frequency output signal, wherein the sensor head is configured to output the high frequency output signal, from which a delay time of the surface acoustic wave after the predetermined number of the plurality of roundtrips is calculated by the external detection/output unit, the delay time being generated by the change in the propagation characteristic. The changes to Claim 1 are supported by the originally filed specification and do not add new matter.[1]

Regarding the rejection of Claim 1 under 35 U.S.C. §103(a), the Office Action asserts that the '787 patent discloses everything in Claim 1 with the exception of a gas sensitive film and a switching unit, and relies on the '688 patent to remedy those deficiencies. Further, as best understood, the Office Action on page 5 states that Claim 1 recites process steps that are "intended use" limitations that are not being given weight. Applicants respectfully traverse such an interpretation of the limitations recited in Claim 1 and respectfully submit that all limitations recited in Claim 1 structurally limit the claimed sensor head.

The '787 patent is directed to an elastic surface-wave device that includes a substrate having a surface, wherein the surface includes a circularly continuous band on a spherical shape; a surface acoustic wave generator that is provided on the surface of the substrate at the circularly continuous band and generates surface acoustic waves on the surface. Further, the

[1] See, e.g., Figures 2A-4B and the discussion related thereto in the specification.

'787 patent discloses that the spherical shape is related to the surface acoustic wave so that the surface acoustic wave propagates within the circularly continuous band in a first direction without diffusing over the circularly continuous band in a second direction other than the first direction.

However, the Office Action admits that the '787 patent fails to disclose a gas-sensitive film at least a part of which is formed on at least a part of the orbital band of a three-dimensional base body, and configured to react with a specific gas molecule so as to develop a change in a propagation characteristic of the surface acoustic wave, as recited in amended Claim 1.

Further, the Office Action admits that the '787 patent fails to disclose an electroacoustic transducer connected to a timing-controlled switching unit disposed outside of the sensor head, wherein the timing-controlled switching unit is configured to switch between an external high frequency generator that transfers a high frequency electric signal to the interdigital transducer and an external detection/output unit, as recited in amended Claim 1. Applicants respectfully submit that the '787 patent is silent regarding a sensor head having an electroacoustic transducer connected to a timing-controlled switching unit, as recited in amended Claim 1.

Further, Applicants respectfully submit that the '787 patent fails to disclose that the sensor head is configured to output the high frequency output signal, from which a delay time of the surface acoustic wave after the predetermined number of the plurality of roundtrips is calculated by the external detection/output unit, the delay time being generated by the change in the propagation characteristic, as recited in amended Claim 1.

The '688 patent is directed to a spherical surface acoustic device. In particular, as shown in Figure 5A, the '688 patent discloses a circulator 41, which is a passive electronic component with three or more ports, wherein the ports can be accessed when a signal is fed

into any port and is transferred to the next port. Further, as shown in Figure 5C, the '688 patent discloses that the circulator 41 serves as a directional coupler that merely separates signals based on the direction of signal propagation at any timing, so that a surface acoustic wave is passively detected every time that the surface acoustic wave orbits along the circular orbital band.

However, Applicants respectfully submit that the '688 patent fails to disclose an electroacoustic transducer connected to a timing-controlled switching unit disposed outside of the sensor head, wherein the timing controlled switching unit is configured to switch between an external high frequency generator and an external detection/output unit so that the timing controlled switching unit is configured to transfer a high frequency electric signal from the external high frequency generator to the transducer, as recited in amended Claim 1. As noted above, the '688 patent discloses that the circulator 41 serves as the directional coupler that separates signals based on the direction of signal propagation and the timing, and that the surface acoustic wave is passively detected every time the surface acoustic wave orbits along the circular orbital path. The '688 circulator is a passive electronic component and can not operate as an active timing-controlled switching unit. Thus, circulator 41 disclosed by the '688 patent cannot switch a signal path actively from the interdigital transducer to the external detection/output unit at a desired timing just before the surface acoustic wave returns from a predetermined number of a plurality of roundtrips, as recited in amended Claim 1.

Further, as stated above, Applicants note that Claim 1 does not recite process steps, but merely recites functional limitations that are performed by various structural elements. In particular, Claim 1 recites a switching unit that is configured to switch a signal path at a certain time. Applicants respectfully submit that these timing limitations are not "intended use," but a structural limitation of the switching unit, because the switching unit must be structurally configured to switch the signal path at the determined times.

Thus, no matter how the teachings of the '787 and '688 patents are combined, the combination does not teach or suggest an interdigital electroacoustic transducer being connected to a timing-controlled switching circuit disposed outside of the sensor head, wherein the timing controlled switching circuit is configured to switch between an external high frequency generator and an external detection/output unit so that the timing controlled switching unit is configured to transfer high frequency electric signal from the external high frequency generator to the interdigital transducer, as recited in amended Claim 1.

Further, the combined teachings of the '787 and '688 patents fail to disclose that the sensor head is configured to output the high frequency output signal, from which a delay time of the surface acoustic wave after the predetermined number of the plurality of roundtrips is calculated by the external detection/output unit, the delay time being generated by the change in the propagation characteristic, as recited in amended Claim 1.

Accordingly, for the reasons stated above, Applicants respectfully submit that the rejection of Claim 1 is rendered moot by the present amendment to that claim.

Regarding the rejection of dependent Claims 4-9 under 35 U.S.C. § 103(a), Applicants respectfully submit that the '500 and '692 patents fail to remedy the deficiencies of the '787 and '688 patents, as discussed above. Accordingly, Applicants respectfully submit that the rejections of dependent Claims 4-9 are rendered moot by the present amendment to Claim 1.

Claim 27 is directed to a sensor head, and includes limitations analogous to the limitations recited in amended Claim 1. Further, Applicants note that Claim 27 recites a second interdigital transducer arranged on the orbital band of the three-dimensional base body separated from the first electroacoustic transducer. Further, Claim 27 has been amended to clarify that the sensor head is configured to output the high frequency output signal, from which a delay time of the surface acoustic wave after the predetermined number

of the plurality of roundtrips along the orbital band is calculated by an external detection/output unit, the delay time being generated by the change in the propagation characteristic, by detecting a transmitted surface acoustic wave through the second interdigital transducer. Accordingly, for the reasons stated above, Applicants respectfully submit that the rejection of Claim 27 is rendered moot by the present amendment to that claim.

Thus, it is respectfully submitted that independent Claims 1 and 27 (and all associated dependent claims) patentably define over any proper combination of the '787, '688, '500, and '692 patents.

Consequently, in view of the present amendment and in light of the above discussion, the outstanding grounds for rejection are believed to have been overcome. The application as amended herewith is believed to be in condition for formal allowance. An early and favorable action to that effect is respectfully requested.

Respectfully submitted,

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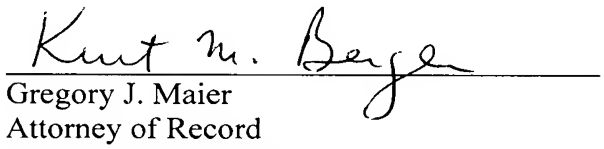

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